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Direct Metal Oxidation

Paul DeBurgomaster

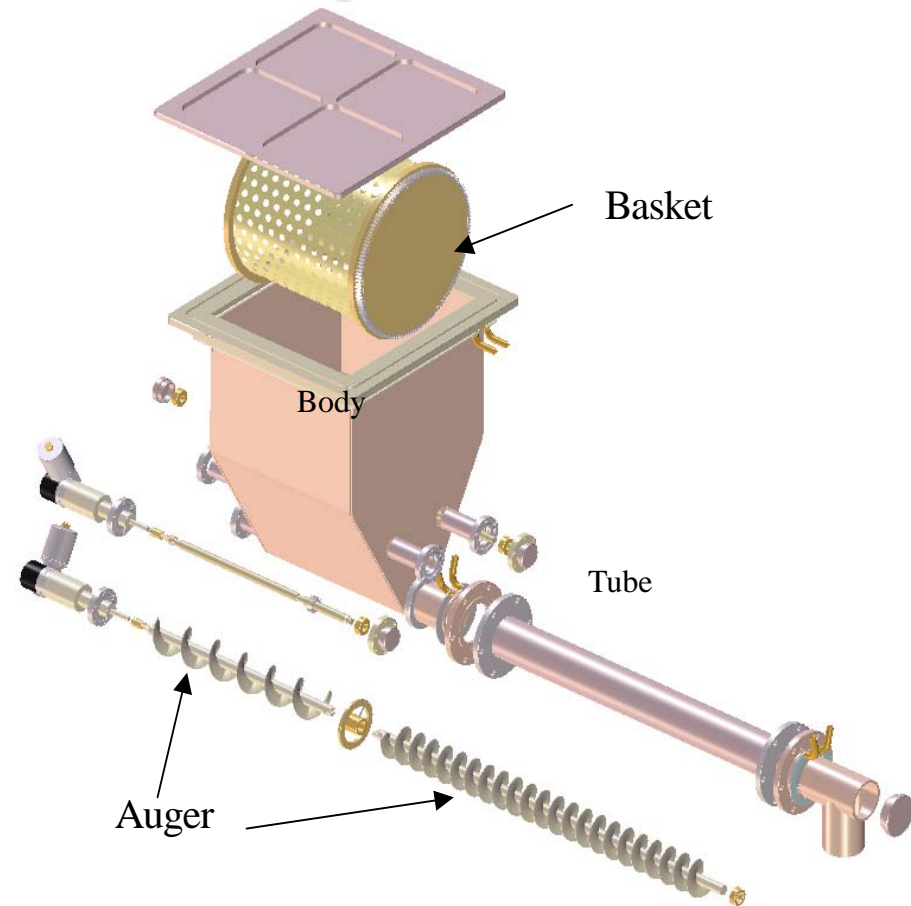
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Agenda

- What is Direct Metal Oxidation?
- Evolution of the furnace
- Operating environment
- Mechanical design improvements
- Questions



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ARIES Direct Metal Oxidation

- Plutonium pits are transformed into plutonium oxide powder by roasting them in a way similar to the roasting of green chili.
- Stabilize the oxide to meet the DOE-STD-3013, and MFFF Interface Control Document (ICD) specification



As generated DMO oxide

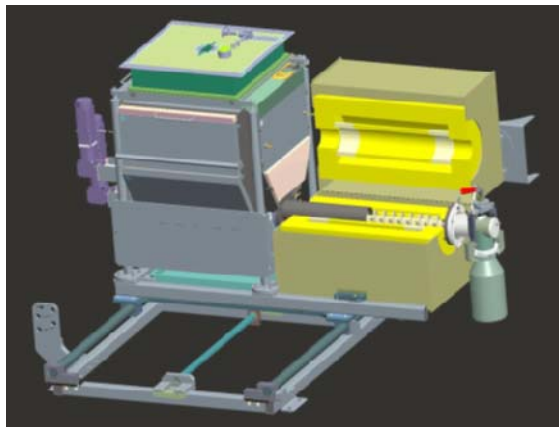
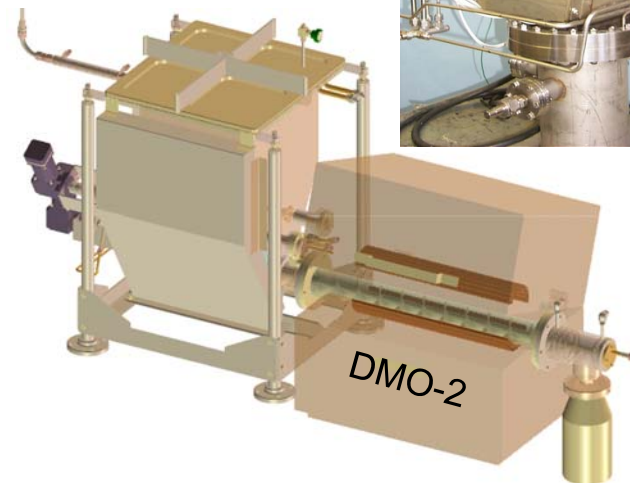
← Milled and blended product



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Evolution of the DMO furnace

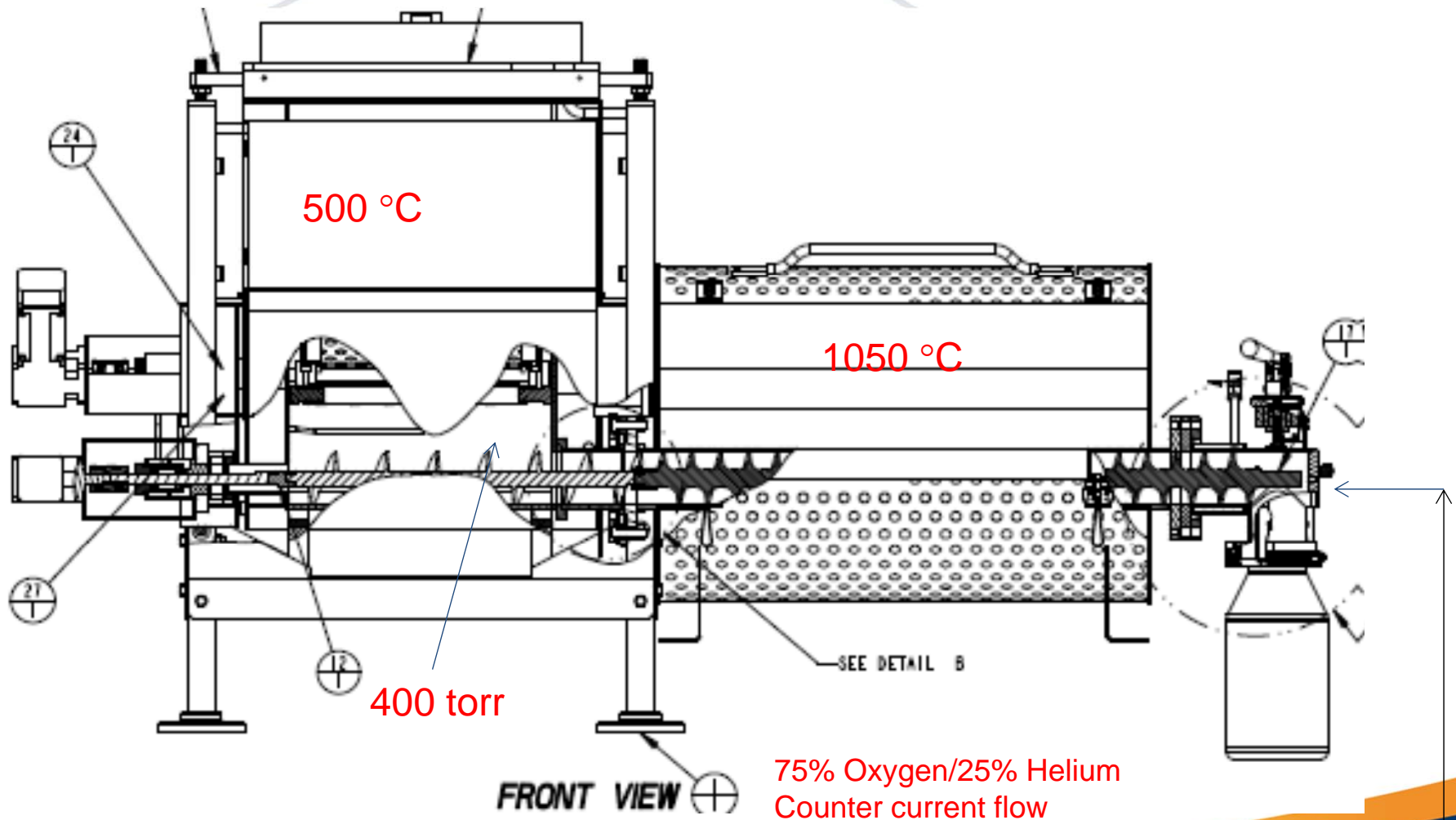
- DMO-1 used for ARIES first and second demonstrations
- DMO-2 installed in 2002 as a demonstration prototype
- DMO-3 installed in 2012 with several design improvements



DMO-3

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DMO Furnace Operating Environment



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DMO-3 vs. DMO-2: Mechanical Design Improvements

- Inconel 600 oxidizer furnace body vs. stainless steel
- Increased heater insulation
- Increased basket-turning gear ratio
- Improved bearing design
- Easily installed/replaced bayonet-style thermocouples
- Three independent calciner heating zones
- Improved access/space for system maintenance



The DMO-3 furnace installed in the glovebox.

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Questions?

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